

## CLAIMS

1. A method for time-sharing a motion detector, including the steps of:
  - a) illuminating a first area of a surface;
  - b) illuminating a second area of a surface;
  - c) collecting data through the said motion detector through an optical signal representing the image of the first area; and
  - d) collecting data through the said motion detector through an optical signal representing the image of the second area.
2. The method of claim 1, wherein said illumination of said first area and said illumination of said second area alternate in time such that one of said areas is not illuminated while the other of said areas is illuminated.
3. The method of claim 1, further comprising the steps of:
  - a) calculating the motion of said first area; and,
  - b) calculating the motion of said second area.
4. The method of claim 3, wherein said first and second areas are on the surface of a ball, and said motion corresponds to rotation of said ball.
5. The method of claim 4, further comprising the steps of:
  - a) transforming the rotational motion measured from said first and second areas to rotational motion about orthogonal axes.
6. The method of claim 1, wherein said areas are separated by a distance at least as great as the length of one of the said areas.

7. The method of claim 4, wherein said areas are on the surface of trackball for computer input.
8. The method of claim 4, wherein said areas are on the surface of a mouse ball for computer input.
9. The method of claim 7, wherein said trackball is for entry of three-dimensional coordinate inputs.
10. The method of claim 7, wherein said trackball is for entry of two-dimensional coordinate inputs.
11. A device for input of coordinate information into a computer, comprising:
- a) a ball;
  - b) a housing for holding the said ball;
  - c) a sphere coextensive with said ball and having an rotational orientation fixed with respect to said housing;
  - d) a first emitter for illuminating a first area on said sphere;
  - e) a second emitter for illuminating a second area on said sphere;
  - f) a detector for detecting motion of the surface of said ball;
  - g) a path for communication of an optical signal from said first area on said sphere to said detector; and,
  - h) a path for communication of an optical signal from said second area on said sphere to said detector.

The device of claim 11, wherein said device is a trackball.

The device of claim 11, wherein said device is a mouse.

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12. A device for measuring motion corresponding to coordinate information for input to a computer, comprising:

- a) a foundation,
- b) a spherical ball, said spherical ball:
  - i) being rotatable with respect to said foundation,
  - ii) carrying a pattern of shapes on the surface of said ball, said pattern being formed by contrasting reflective properties on said surface of said ball, and said pattern containing shapes which are of similar geometry, said shapes being repeated at a plurality of locations on said surface of said ball,
- c) a sensor, said sensor being:
  - i) supported by said foundation,
  - ii) capable of detecting electromagnetic radiation emanating from a portion of the surface of said ball, and capable of detecting said contrasting reflective properties and said pattern on said ball,

whereby said sensor can detect a given geometrical shape from a set of repeating geometrical shapes and thereby measure the rotation of said ball with respect to said sensor.

2. The device of claim 12, wherein said pattern on said surface of said ball is based on a Platonic solid whose faces are projected to said surface of said ball.

3. The device of claim 12, wherein said pattern on said surface of said ball is based on a set of triangles whose edges are projected to said surface of said ball.

4. The device of claim 12, wherein said pattern on said surface of said ball is based

on a set of intersecting line segments which are projected to said surface of said ball.

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16. The device of claim 12, wherein said pattern on said surface of said ball forms a tiling, wherein a single geometrical shape is repeated at a plurality of locations on the sphere surface.

17. The device of claim 12, further comprising:

- a) a first emitter for illuminating a first area on said sphere;
- b) a second emitter for illuminating a second area on said sphere;
- c) a detector for detecting motion of the surface of said ball;
- d) a path for communication of an optical signal from said first area on said sphere to said detector; and,
- e) a path for communication of an optical signal from said second area on said sphere to said detector.

18. The method of claim 1, wherein

- a) said first and second areas are on a sphere coextensive with a ball, said ball is rotatable with respect to a housing, and said rotation corresponds to coordinate input to a computer.
19. The method of claim 18, wherein said ball carries a regular pattern of contrasting reflective properties.
20. The method of claim 18, wherein said ball carries an irregular pattern of contrasting reflective properties.

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